

xSwitch

Installation & User's Guide



THE TELOS ALLIANCE®

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TelosAlliance.com

User Warnings and Cautions

The installation and service instructions in this manual are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified personnel

This instrument has an autoranging line voltage input. Ensure the power voltage is within the specified range of 100-240VAC. The ~ symbol, if used, indicates an alternating current supply.



This symbol, wherever it appears, alerts you to the presence of uninsulated, dangerous voltage inside the enclosure – voltage which may be sufficient to constitute a risk of shock.



This symbol, wherever it appears, alerts you to important operating and maintenance instructions. Read the manual.

CAUTION: HAZARDOUS VOLTAGES

The instrument power supply incorporates an internal fuse. Hazardous voltages may still be present on some of the primary parts even when the fuse has blown. If fuse replacement is required, replace fuse only with same type and value for continued protection against fire.

WARNING:

The product's power cord is the primary disconnect device. The socket outlet should be located near the device and easily accessible. The unit should not be located such that access to the power cord is impaired. If the unit is incorporated into an equipment rack, an easily accessible safety disconnect device should be included in the rack design.

To reduce the risk of electrical shock, do not expose this product to rain or moisture. This unit is for indoor use only.

This equipment requires the free flow of air for adequate cooling. Do not block the ventilation openings on the rear and sides of the unit. Failure to allow proper ventilation could damage the unit or create a fire hazard. Do not place the units on a carpet, bedding, or other materials that could interfere with any panel ventilation openings.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

USA CLASS A COMPUTING DEVICE INFORMATION TO USER.

WARNING:

This equipment generates, uses, and can radiate radio-frequency energy. If it is not installed and used as directed by this manual, it may cause interference to radio communication. This equipment complies with the limits for a Class A computing device, as specified by FCC rules, part 15, subpart j, which are designed to provide reasonable protection against such interference when this type of equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference. If it does, the user will be required to eliminate the interference at the user's expense. Note: objectionable interference to TV or radio reception can occur if other devices are connected to this device without the use of shielded interconnect cables. FCC rules require the use of shielded cables.

CANADA WARNING:

“This digital apparatus does not exceed the Class A limits for radio noise emissions set out in the radio interference regulations of the Canadian department of communications.”

“Le présent appareil numérique n’émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques (de Class A) prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des communications du Canada.”

CE CONFORMANCE INFORMATION:

This device complies with the requirements of the EEC council directives:

- ◆ 93/68/EEC (CE MARKING)
- ◆ 73/23/EEC (SAFETY – LOW VOLTAGE DIRECTIVE)
- ◆ 89/336/EEC (ELECTROMAGNETIC COMPATIBILITY)

Conformity is declared to those standards: EN50081-1, EN50082-1.

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Patent information can be found at www.TelosAlliance.com/legal

Updates

Axia iQx features and operations are determined largely by software. The Telos Alliance strives to provide the most stable and feature-rich software available. We encourage you to check for software updates from time to time by visiting our website or by contacting us directly.

Feedback

We welcome feedback on any aspect of our products or this manual. In the past, many good ideas from users have made their way into software revisions or new products. Please contact us with your comments or suggestions.

We support you...

By Phone/Fax

You may reach our Telos Support Team in emergencies by calling +1 216-622-0247. For billing questions or other non-emergency technical questions, call +1 216-241-7225 between 9:00 AM to 5:00 PM USA Eastern Time, Monday through Friday.

By Email.

Non-emergency technical support is available at Support@TelosAlliance.com.

By Web

The Axia Web site has a variety of information that may be useful for product selection and support. The URL is <https://www.telosalliance.com/Axia>.

SERVICE

You must contact Telos Alliance before returning any equipment for factory service. We will need your unit's serial number, located on the back of the unit. We will issue a return authorization number, which must be written on the exterior of your shipping container. Please do not include cables or accessories unless specifically requested by the Technical Support Engineer. Be sure to adequately insure your shipment for its replacement value. Packages without proper authorization may be refused. US customers, please contact Telos Alliance Technical Support at +1-216-622-0247. All other customers should contact local representative to make arrangements for service.

Warranty



For the latest Telos Alliance warranty, visit: telosalliance.com/warranty

Register your product

Register your product today to get the full benefits of our warranty, support, and product updates. telosalliance.com/product-registration/

The Telos Alliance

1241 Superior Ave. Cleveland, OH 44114 USA
+1 (216) 241-7225

For Telos Support:

24/7 telephone: +1 (216) 622-0247
Email: support@telosalliance.com
Web: telosalliance.com/support-request

Table of Contents

1	<i>Introducing the xSwitch</i>	7
	The Front Panel	1
	Rear Panel	1
	HTML Interface	1
	What's Next	1

2	<i>Setup</i>	3
	Assigning an ID to the xSwitch	3
	Manual assignment of an IP address	3
	Using iProbe to push IP address.	4
	Web Interface	4
	Restoring Defaults	4
	What's Next	4

3	<i>The xSwitch in depth</i>	5
	Mounting	5
	Web Interface.	6
	Home	6
	Simple Setup	6
	Switch Statistics.	6
	IGMP Snooping	7
	System	8
	Front panel pages.	8
	Switch details.	9

A	<i>xSwitch Specifications</i>	11
	Power Supply AC Input	11
	Environmental Ranges	11
	Physical Dimensions	11
	Power over Ethernet	11
	Connector Specifications.	11
	10/100/1000 Ports	11
	Connecting to 100BASE-T-Compatible Devices	11
	Connecting to 1000BASE-T Devices	11
	SFP Module Ports	11

	<i>Warranty</i>	13
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Chapter One:

Introducing the xSwitch

The xSwitch is a member of the xNode family, compact half-rack Livewire devices. The xSwitch is intended to be used with Livewire devices and thus has been configured for the customer, with almost no setup required!

The Front Panel



Figure 1-1: xSwitch Front Panel

The xSwitch has an OLED display on the left side providing status and setup information.

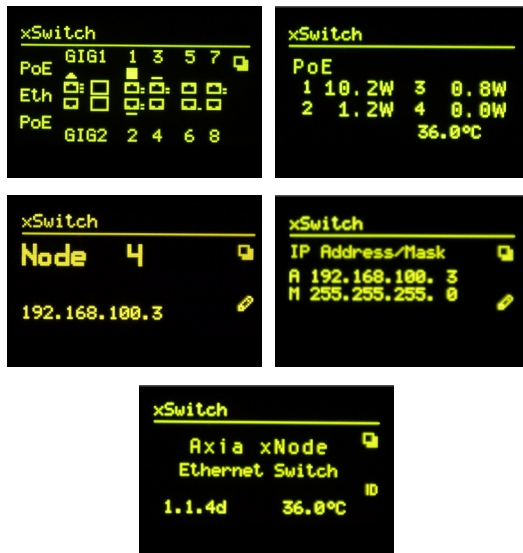


Figure 1-2: xSwitch OLED Display

Rear Panel

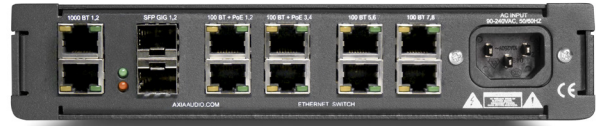


Figure 1-3: xSwitch Rear Panel

The rear panel of the xSwitch has multiple network ports for connecting Livewire devices:

- Two Gigabit ports which are accessed through either a 1000BASE-T connection or Small-Form-Factor pluggable (SFP) connection.
- Four 100BASE-T + PoE (Power over Ethernet) ports
- Four 100BASE-T ports

There is also a single IEC connector to power the xSwitch.

HTML Interface

Along with the front panel OLED display, the xSwitch has an HTML interface that can be accessed with a PC connected to the same network and within the same subnet. When entering the IP address of the xSwitch in a browser, an authentication window will ask for a username and password. The defaults are:

Username: user
Password: (none)

What's Next

Now that you've got a basic overview, let's start routing some packets with your xSwitch! First, you'll need to assign an IP address; this can be done through the front panel controls, or with Axia iProbe software. The next chapters will show you how and discuss setup and details about your xSwitch. 🔄

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Chapter Two:

Setup

When the xSwitch boots for first time, it will have no IP address. An IP address can be assigned to the xSwitch in any of three ways:

1. Assign the xSwitch a NODE-ID value, which in turn assigns an IP address.
2. Enter an IP address from the front panel.
3. Use the *bootp* server within iProbe to push an IP address to the xSwitch.

These three methods are given more detail below.

Assigning an ID to the xSwitch

The Axia xNode family uses an ID schema for identifying each device, in which assigning a unique ID number also assigns a unique IP address. The xSwitch supports this schema. To do this, press the top button to the right of the OLED display a few times until the page shown is the Node ID page.



Figure 2-1

No ID value should be shown, as the xSwitch has not been given an ID number yet. Press and hold the lower button (represented by the pencil icon) for 10 seconds to edit the ID value. Note that if the screen has fallen asleep (the OLED display dims), a single button press is required to wake up the front panel before pressing and holding the edit button.

In Edit mode, a cursor appears next to the word “Node”. The top button becomes an increment button and increases the numerical value at the cursor position; the bottom button becomes the next key, moving the cursor to the next position. After the last digit is entered, the xSwitch is assigned the ID value and an IP address in the subnet of 10.216.x.y . If, during this process, there is inactivity for 30 seconds, edit mode times out and no ID will be assigned.

MORE ON ID VALUES: Number ranges of 1-99 (nn) supports small-to-medium networks with up to 99 network devices. The ID defines the IP address 10.216.0.1nn . Number ranges of 100-319 (abc) supports large networks with up to 2299 network devices. When the 3 digit ID is being used, a second level identifier becomes available with range of d=<0-9>. The ID defines the IP address 10.216.ab.1cd .

If an IP address has previously been assigned to the xSwitch, assigning an ID number moves the cursor to the IP Address field, allowing the user to toggle with the increment button (top button) between the ID-assigned value and the previous assigned value.

Manual assignment of an IP address

The xSwitch can be given an IP address to fit within a previously established network schema by accessing the IP address page on the front panel and entering into edit mode. Press and hold the lower button (shown with a pencil icon) for 10 seconds.

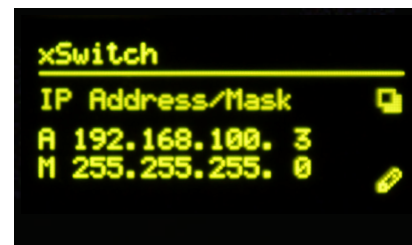


Figure 2-2

A cursor will appear in the address field. Use the top button to increment and the bottom button to move the cursor to the next position. After 30 seconds of no activity, the Edit view will time out. Once the IP address is edited, pressing the next button (bottom button) will

move the editing to the next line which is the netmask setting. Pressing the next button (bottom button) from the netmask position will save the values.

Using iProbe to push IP address

When an xSwitch boots with no IP address, it will broadcast a bootp request, which continues until an IP address setting is applied. iProbe includes a bootp server, which “hears” this request and can push an IP address to the xSwitch.

A counter at the bootstrap configuration button will

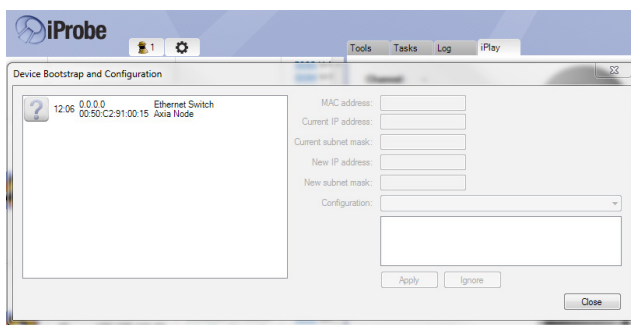


Figure 2-3

appear when requests are received. Clicking on the button will open the Device Bootstrap and Configuration window.

From this window view, select the device from the left side pane and the configuration options will appear on the right side. Enter in an IP address and netmask and press the Apply button.

Web Interface

Once an IP address is assigned to the xSwitch, a PC can access the HTML interface of the device. Make sure that the PC has been given a static IP address within the same subnet as the xSwitch. When accessing the user interface (UI), an authentication window will appear asking for a username and password.

The default values are:

Username: user

Password: (none)

The home page shows device information under the System heading. There is a “Simple Setup” button on the page which will present the Simple Setup page.

The Simple Setup page only shows the Node ID value, allowing the user to assign an ID value from the web UI as opposed to using the front panel. That’s all the setup there is — the rest of the switch configuration is pre-programmed for Livewire by the engineers at Axia!

Restoring Defaults

Performing factory reset will clear all configurations and return the xSwitch to a “blank canvas”. To restore default, execute the following steps.

- Disconnect all power from the xSwitch, then press and hold the two front panel buttons.
- Apply power to the xSwitch while continuing to press the buttons.
- xSwitch will show a countdown timer for factory reset. When the timer reaches 0, release the two buttons.

What’s Next

Now that you’ve had the overview, let’s get a closer look. In the next chapter, we’ll look at xSwitch in detail, and discuss mounting options as well. 🌀

Chapter Three:

The xSwitch in depth

The xSwitch is a 1U half-rack device that can be mounted to a flat surface or in an equipment rack with optional accessories.

Mounting

Optional Surface Mount kit

The optional surface mount kit (p/n 2011-00077) consists of two brackets that are used to secure the xSwitch to a wall, under a desk, or almost any flat surface.

The brackets secure to the side of the xSwitch, towards the front panel. There are four holes which are used for securing metal work to the xSwitch.



Figure 3-1

Secure the bracket to the xSwitch with included screws in the desired configuration.



Figure 3-2 Outward configuration



Figure 3-3: Inward configuration

Optional Rack Mount kit

A rack mount kit is provided with each xSwitch, which contains one (1) short rack ear, one (1) long rack ear, one (1) spacer, and associated screws. These parts allow for the mounting of the xSwitch in a standard 19" equipment rack. Thanks to its half-rack design, you can join xSwitch to another member of the xNode family to mount two devices in a single RU space.



Figure 3-4: Short rack ear



Figure 3-5: Long rack ear

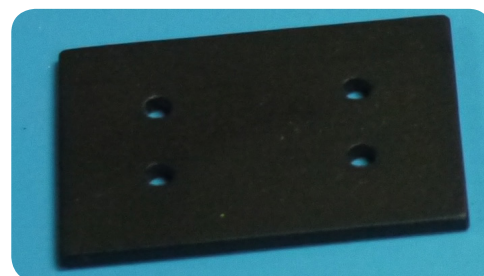


Figure 3-6: Spacer

Single xSwitch

Secure the short rack ear to one side of the xSwitch.
Secure the long ear to the opposing side of the xSwitch.



Figure 3-8

Double Mount

Remove the top lid from both devices. Place side by side. Place spacer between the two as shown.

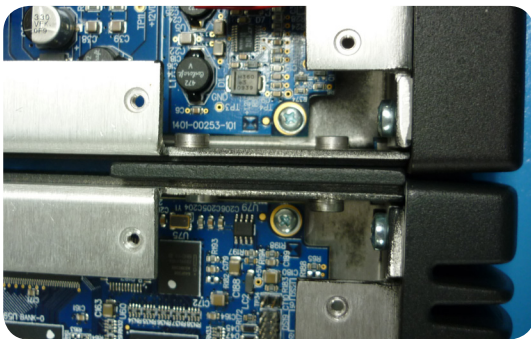


Figure 3-9a

Use the four (4) screws provided to secure the two devices together.

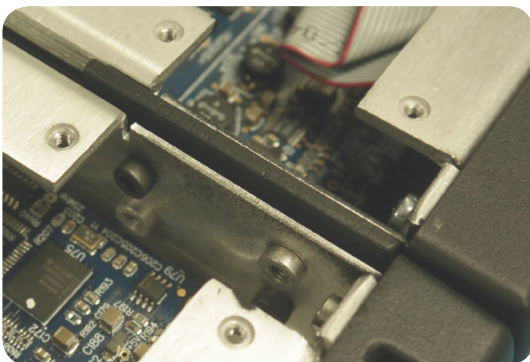


Figure 3-9b

Return the lids and secure. Attach a short rack ear to either side of the devices.



Figure 3-10

Web Interface

The first time an HTML request is issued to a xSwitch, a login and password is requested. The default authentication is:

Username: user

Password: (none)

Home

The home page shows system information and acts as the default page for xSwitch.

Software Version: The code version which is used by the xSwitch.

Temperature: The temperature reading of the internal sensor. Alarm status will appear if the temperature is above acceptable limits.

System Uptime: The amount of time since the last boot up.

The Home page also has a button, “Simple Setup”, which links to the Simple Setup page.

Switch Port Status: Each port is identified and information on the link status and PoE usage is reported. At the bottom of the list of ports is a multicast router identifier which reports which ports are connected to devices that manage IGMP reports.

Simple Setup

Simple Setup provides only a Node ID option to the user. All other configuration options have already been done for the customer by the Axia Engineers.

Switch Statistics

The Switch Statistics link provides comprehensive per-port statistics common to Ethernet switchgear. In-

gress statistics refers to packets entering the switch through the port. Egress statistics refer to packets leaving the switch through the port. The page also identifies the different size of packets passing through the switch in the Histogram Statistics Counters.

Other statistic readouts are provided for your information, as follows:

- GoodOctet – represents good data. An octet refers to 8 bits. Generally octet and byte are synonyms, but some platforms in the past may have used byte to refer to a different storage amount. To avoid ambiguity, the term octet is used.
- Bad Octet – counter of bad data. Octet refers to 8 bits.
- Unicast – Transmission of data from one to one. The counter indicates the amount of packets which are unicast transmission messages.
- Broadcast – Transmission of data from one to all. The counter indicates the amount of packets which are broadcast transmission messages.
- Multicast – Transmission of data from one to many – the basis of Livewire audio. The counter indicates the amount of packets which are multicast packets.
- Pause – The counter shows the amount of Pause frames as defined by the IEEE 802.3x standard. This is a form of flow control allowing overwhelmed network ends to halt data transmission.
- Undersize - The number of packets received that were less than 64 octets long but were otherwise well formed.
- Fragments – The number of packets received that were less than 64 octets in length and had either a bad Frame Check Sequence with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
- Oversize – The number of packets received that were longer than 1518 octets but were otherwise well formed.
- Jabber – The number of packets received that were longer than 1518 octets, and had either a bad Frame Check Sequence with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
- RxErr – Error in received packets.
- FCSErr – Frame Check Sequence errors indicate cor-

rupted data on transmission.

- Deferred – Counter increments when a frame is to be sent but the carrier is found to be busy. Typically an issue only with half-duplex connections.
- Collisions - The result of two or more devices transmitting at the same time on the same segment, producing a garbled transmission. Collisions typically are not an issue with full-duplex switched networks.
- InDiscards – Counter of packets received that are tagged for a VLAN that the port is not associated with, and so are dropped.
- InFiltered – Ingress packets being filtered.
- OutFiltered – Egress packets being filtered.
- <65 - 1024> – counters of different sized packets that travel in and out of the switch.

IGMP Snooping

IGMP Snooping link provides information about the switch's snooping activity. In snooping, the switch is able to determine which ports have requested a multicast group and also determine how many groups have been requested (Multicast Group Count). The page will also identify the source of IGMP query messages and on which port these messages are arriving.

The IGMP Snooping Table identifies the various groups within the switch and which ports have made requests for these groups. In cases where the group is one that is used by Livewire, it will be identified by its simpler Livewire Channel number or administrative function. In some cases you may see groups that are listed which have no Livewire Channel. Some devices on the network may request other multicast streams which are used by other standards. Some examples:

224.0.0.107 - PTP

224.0.0.251 - mDNS

224.0.0.252 - LLMNR

...and a large list of others which can be found by doing an Internet search on multicast addresses.

The IGMP snooping table will display all of the multicast request that have been made by devices connected to the xSwitch.

System

The System page provides network settings, SNMP settings, Syslog settings, authentication password, and firmware control.

Host name: Name of the device on the network. Up to 12 characters using only letters, numbers, or hyphens (no spaces or special characters). Host name is auto populated when you assign an ID to the xSwitch providing a unique name. You may customize this field if you desire.

Network address: The IP address of the device as it was configured either by an automated process or by a manual process. The address can be changed here, but once you apply the changes, you will lose connection and will need to connect to the device with the new IP address you just assigned.

Netmask: The netmask is a filter to which helps to define the subnetwork. This is a topic covered in networking material widely available. For simplicity, a value of 255.0.0.0 is a wide open filter and a value of 255.255.255.254 is a very narrow filter. If you are not familiar with how subnetting works, please refer to your network administrator. A value of 255.255.255.0 is usually suitable for most cases.

Gateway: The gateway is a device that handles requests and responses from devices that are in different subnets. A gateway is what is needed when dealing with more than a single subnet. If creating a Livewire network on a dedicated local area network (LAN), then the value of the gateway can likely be ignored. If not familiar with the function of gateways, please ask your network administrator.

System location: Define system location for SNMP

System contact: Define system contact for SNMP

SNMP community name: Define the community for SNMP functionality

Syslog server: IP address of the computer which is running a syslog server application.

Syslog severity level filter: The 8 standard syslog levels are available for selection.

User password: The authentication password can be changed by entering in the password twice in the two fields.

Firmware version: The xSwitch uses two storage banks to store software for the xSwitch. Switching to a new version of software is done by selecting the other radio button and pressing Apply button.

NOTE Selecting a new version of software to operate under requires a reboot of the xSwitch. Rebooting will cause any audio streams to be interrupted until the reboot completes.

If Bank 1 is empty, you will use the Browse function to locate the desired software that has been downloaded to your computer. Once the file is selected, pressing the Apply button will upload the software into the bank. The process will not interrupt the operation of the xSwitch. Once complete, the System page will return and the two banks will show versions of software.

If operating with Bank 1, and you wish to upload a different version, you will select the “commit this version to Bank 0” and press Apply button. This will move the code to Bank 0 and empty Bank 1.

Front panel pages

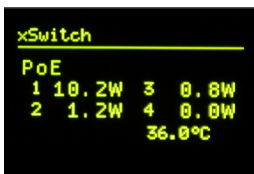
The xSwitch front-panel OLED display presents useful data to the user. Each screen is called a page and the pages can be toggled by pressing the top button — you’ll see the Page icon change as you do so.

- Device Page – shows the type of device, the version of software running, and the current operating temperature. The bottom button has a function defined by the icon near the button. The icon states “ID”. Pressing the bottom button when ID icon is displayed cause the device to send out a bootp request. Axia iProbe software is able to recognize these broadcast messages and provides an interface to push information to the device.

- Port status page – shows status of the two 1000bt ports (copper and SFP), the four PoE ports, and the four 100bt ports. From this page, the user can identify which ports are active, the link speed, PoE active, and which port is an uplink port.
 - » Ports blinking indicate an active port.
 - » 1 dot next to a port indicates 10bt, 2 dots next to port indicate 100bt, and 3 dots next to port indicate 1000bt.
 - » A bar above or below a port indicates active PoE on that port. The amount of power through the port is represented by the size of the bar.
 - » An arrow pointing away from port indicates an uplink port.



- PoE status page – shows the wattage applied to each of the four (4) PoE ports. The xSwitch’s operating temperature is also displayed.



- Node-ID page – shows the ID of the device and permits the editing of this value with a 10 second press of the ‘pencil’ (bottom) button. The IP address is also shown.
- IP address page – shows the IP address of the device and the netmask. Pressing the pencil (bottom) button for 10 seconds allows manual editing of the IP address from the front panel.

Switch details

The xSwitch supports 4 QoS queues. Highest priority given to CoS 6 and 7. DCSP priority also recognized.

IGMP version 2 supported. IGMP snooping query function is enabled with 10 second response time for general queries. The xSwitch will relinquish the query function if a multicast router or another querier at a lower IP address is detected. The xSwitch has a 200 second time out for router presence. If another querier is not detected within the time out period, the xSwitch delegates itself as a querier.

The xSwitch has two 1-gigabit ports. A port is either the 1000BT copper interface or the SFP interface. If both interfaces of the port are connected, the first detected will be the active interface. The active interface is used until the link goes down. In such a case, the second interface becomes active for the port.

The SFP interface accepts fiber or copper modules. In case of the copper SFP module, only 1Gbit/s speed is supported.

The xSwitch supports a single VLAN.

The xSwitch has a hardware filter capacity of 8k. This is a single capacity for both MAC addresses and multicast groups. The amount of either can vary between network, but in any case, the xSwitch can manage any amount of multicast groups connected to its 10 ports.

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Appendix A: xSwitch Specifications

Power Supply AC Input

- Auto-ranging supply, 95VAC to 240VAC, 1.0 A, 50 Hz to 60 Hz
- IEC receptacle, internal fuse
- Power consumption: 75 Watts (all PoE ports under load)

Environmental Ranges

- Operating temperature: 32° F to 104° F (0°C to 40°C),
- Relative humidity: <90% (noncondensing)

Physical Dimensions

- 8.5" (22 cm) wide; two may be mounted side-by-side in a standard 1RU rack space (with included mounting kit)
- 1.72" (4.4 cm) height, 11.75" (30 cm) depth
- Shipping Weight: 7 lbs. (3.2 kg.)
- Shipping Dimensions: 17" (43.2 cm) length, 13" (33 cm) width, 7" (17.8 cm) height

Power over Ethernet

- 15.4 W-per-port maximum, 61.6-W switch maximum

Connector Specifications

10/100/1000 Ports

The 10/100/1000 Ethernet ports use standard RJ-45 connectors.

Connecting to 100BASE-T-Compatible Devices

When connecting the ports to 100BASE-TX-compatible devices, you can use a two or four twisted-pair, Category 5e, straight-through cable.

Connecting to 1000BASE-T Devices

When connecting the ports to 1000BASE-T devices, you must use a four twisted-pair, Category 6, straight-through cable.

SFP Module Ports

The SFP module slot on a dual-purpose port uses SFP modules for fiber-optic and copper uplink ports. xSwitch works with the following supported SFP modules:

- Cisco Copper SFP Model:GLC-T=
- Cisco Copper SFP Model: SFP-GE-T=
- Cisco Multimode fiber model: GLC-SX-MMD=
- Cisco Multimode fiber model: GLC-SX-MM-RGD

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Warranty

Telos Alliance Limited Warranty



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